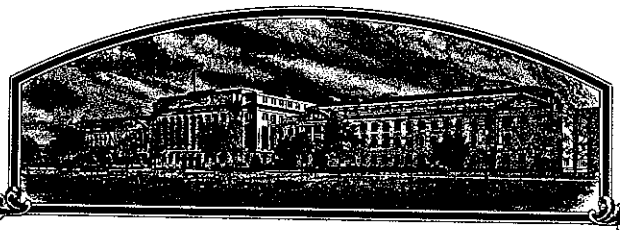
No. 8800104



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Plant Genetics, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

ALFALFA

'Vortex'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D. C. this 30th day of September in the year of our Lord one thousand nine hundred and eighty-eight.

Attest:

Kenneth H. Evans
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Richard E. Lyng
Secretary of Agriculture

APPROVAL EXPIRES 2-28-88

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

FORM APPROVED: OMB NO. 0581-0055

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION	3. VARIETY NAME
PLANT GENETICS, INC.	83B27	Vortex

4. ADDRESS (Street and No. or R.F.D. No., City, State, and Zip Code)	5. PHONE (Include area code)	FOR OFFICIAL USE ONLY
1930 Fifth Street Davis, CA 95616	(916) 753-1400	PVPO NUMBER 8800104

6. GENUS AND SPECIES NAME	7. FAMILY NAME (Botanical)
Medicago sativa	Leguminoseae

FILING
DATE: March 8, 1988
TIME: 10:00 [✓] A.M. [ ] P.M.

8. KIND NAME	9. DATE OF DETERMINATION
Alfalfa	Foundation, Fall 1985

FEES RECEIVED
AMOUNT FOR FILING: $ 1800 00
DATE: March 8 1988
AMOUNT FOR CERTIFICATE: $ 200 00
DATE: August 1, 1988

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.)

Corporation

11. IF INCORPORATED, GIVE STATE OF INCORPORATION	12. DATE OF INCORPORATION
California	January 1981

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

Mr. James C. Weseman
Limbach, Limbach, & Sutton
2001 Ferry Building
San Francisco, CA 94111

PHONE (Include area code): (415)433-4150

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

a. [X] Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
b. [X] Exhibit B, Novelty Statement.
c. [X] Exhibit C, Objective Description of Variety *(Request form from Plant Variety Protection Office.)*
d. [ ] Exhibit D, Additional Description of Variety.
e. [X] Exhibit E, Statement of the Basis of Applicant's Ownership.

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act.)* [ ] Yes *(If "Yes," answer items 16 and 17 below)* [X] No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? [ ] Yes [ ] No

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? [ ] Foundation [ ] Registered [ ] Certified

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.? [ ] Yes *(If "Yes," give date)* [X] No

19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES? [X] Yes *(If "Yes," give names of countries and dates)*

U.S.A. - March 26, 1987

[ ] No

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT	DATE
Keith A. Walker, Vice President, Research	March 4, 1988
SIGNATURE OF APPLICANT	DATE
[signature]	

FORM LS-470 (3-86) *Edition of 7-84 obsolete.*

Exhibit 14A

Vortex is a 77 plant synthetic moderate dormant variety. It was developed by mass selecting plants for persistence, good agronomic characteristics, and disease-free roots, in 3-4 year old established fields in northeastern California. Vortex traces to Apollo (26%), Magnum (23%), Atra 55 (20%), WL 312 (18%), and RS209 (13%). Plants were pollinated in 1983 to produce breeder seed (Syn 1) near Woodland, California, in an isolation cage. Vortex is stable and uniform through the foundation seed generation commensurate with other alfalfa cultivars based on 10 years of data collection and observations. The certified seed generation has revealed no variants from the previous generations.

Exhibit 148

Vortex is most similar to Apollo, Blazer, and Decathlon, out differs in the following pest resistances and dormancy ratings.

Characteristics	Vortex	Apollo[a]	Blazer[a]	Decathlon[a]
Dormancy	4	4	3	4
Bacterial Wilt	HR	R	HR	HR
Verticillium Wilt	LR	-	LR	MR
Fusarium Wilt	R	R	R	R
Anthracnose	LR	LR	LR	MR
Phytophthora Root Rot	R	R	MR	MR
Spotted Alfalfa Aphid	R	MR	-	R
Pea Aphid	MR	MR	HR	R
Blue Alfalfa Aphid	MR	-	-	MR
Stem Nematode	R	MR	HR	R

[a] 1987 Alfalfa Varieties - Published by the Certified Alfalfa Seed Council.

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Exhibit 14B (continued)

Vortex differs from the reported characteristics for Preserve and Seagull (alfalfa brand not certified by NAVRB) in the following pest resistance and dormancy ratings:

Characteristics	Vortex	Preserve[1]	Seagull[2]
Fall Dormancy	4	4	MH
Bacterial Wilt	HR	R	R
Verticillium Wilt	LR	--	S
Fusarium Wilt	R	R	MR
Anthracnose	LR	MR	MR
Phytophthora Root Rot	R	MR	R
Spotted Alfalfa Aphid	R	HR	R
Pea Aphid[3]	MR	--	R
Blue Alfalfa Aphid	MR	--	--
Stem Nematode	R	--	MR

Dashes indicate variety or brand is susceptible or has not been adequately tested.

---

[1] 1987 Alfalfa Varieties -- Published by the Certified Alfalfa Seed Council.

[2] Data taken from Table 3 of publication from Malheur Experiment Station, Ontario, Oregon (1986), furnished by Mr. Rogna Burnett of Green Thumb Incorporated, April 1988.

[3] Resistant check variety CUF 101

Added 7/6/88, AB

FORM APPROVED - OMB NO. 0581-0055

EXHIBIT C
(Alfalfa)

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK AND SEED DIVISION
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MARYLAND 20705

OBJECTIVE DESCRIPTION OF VARIETY
ALFALFA *(Medicago sativa* sensu Gunn et al.*)*

NAME OF APPLICANT(S)	TEMPORARY DESIGNATION	VARIETY NAME
PLANT GENETICS, INC.	83B27	Vortex

ADDRESS *(Street and No., or R.F.D. No., City, State, and Zip Code)*

1930 Fifth Street
Davis, CA 95616

FOR OFFICIAL USE ONLY

PVPO NUMBER 8800104

PLEASE READ ALL INSTRUCTIONS CAREFULLY: Place numbers in the boxes to designate the expressions which are characteristic of the commerical generations of the application variety. Data for quantitative plant characters should be based on a minimum of 100 plants. Include leading zeros when necessary (e.g., [0][8][9]) for quantitative data. Comparative data should be determined from varieties entered in the same trial. Plant color may be precisely designated by using any recognized color chart, e.g., The Munsell Plant Tissue Color Charts.

1. WINTERHARDINESS:

[6] CLASS:

1 = Very Non-Winterhardy (CUF 101)
2 = Non-Winterhardy (Moapa 69)
3 = Intermediately Non-Winterhardy (Mesilla)
4 = Semi-Winterhardy (Lahontan)
5 = (Du Puits)
6 = Moderately Winterhardy (Saranac)
7 = (Ranger)
8 = Winterhardy (Vernal)
9 = Extremely Winterhardy (Norseman)

TEST LOCATION: Nampa, ID; Stockbridge, MI

2. FALL DORMANCY:

FALL DORMANCY (DETERMINED FROM SPACED PLANTINGS)

TESTING INSTITUTION AND LOCATION	DATE OF LAST CUT	DATE REGROWTH SCORED	REGROWTH SCORE OR AVERAGE HEIGHT				LSD .05
			APPLICATION VARIETY	CHECK VARIETIES*			
				Saranac AR	Vernal	Lahontan	
Plant Genetics, Inc.							
Nampa, ID	9/4/84	9/19/84	4.8	4.3	3.0	6.8	0.8
Stockbridge, MI	8/27/85	10/3/85	11.3	12.3	10.0	-	1.8

* CUF 101, Moapa 69, Mesilla, Lahontan, Du Puits, Saranac, Ranger, Vernal, or Norseman as appropriate.

Specify scoring system used: Regrowth in inches

[5] Fall Growth Habit (Determined from Fall Dormancy Trials)

1 = Erect (CUF 101)
3 = Semierect (Mesilla)
5 = Intermediate (Saranac)
7 = Semidecumbent (Vernal)
9 = Decumbent (Norseman)

3. RECOVERY AFTER FIRST SPRING CUT (In Southwest, first cut after March 21):

[ ]

1 = Very Fast (CUF 101)
3 = Fast (Saranac)
5 = Intermediate (Ranger)
7 = Slow (Vernal)
9 = Very Slow (Norseman)

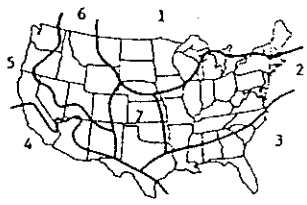
TEST LOCATION: No Data

4. AREAS OF ADAPTATION IN U.S. (Where tested and proven adapted):

[1] Primary Area of Adaptation

[2] [6] Other Areas of Adaptation

1 = North Central
2 = East Central
3 = Southeast
4 = Southwest
5 = Moderately Winterhardy Intermountain
6 = Winterhardy Intermountain
7 = Great Plains
8 = Other *(Specify)* _____



5. FLOWERING DATE (When 10% of plants possess open flowers at time of first spring cut):

[ ][ ] Days Earlier Than [ ]
Same As [ ]
[ ][ ] Days Later Than [ ]

1 = CUF 101
2 = Mesilla
3 = Saranac
4 = Vernal
5 = Norseman

TEST LOCATION: No Data

5

8800104

6. PLANT COLOR (Determined from healthy regrowth 3 weeks after first spring cut, controlling leafhoppers if necessary):

[ ] 1 = Very Dark Green (524) 2 = Dark Green (Vernal) 3 = Light Green (Ranger)

COLOR CHART VALUE (Specify chart used: No comparison with varieties listed above):

APPLICATION VARIETY:

VERNAL:

TEST LOCATION:

7. CROWN TYPE (Determined from spaced plantings):

[2] Noncreeping Types: 1 = Broad (Vernal) 2 = Intermediate (Saranac) 3 = Narrow (CUF 101)

Creeping Types: 4 = Creeping Rooted (Rangelander) 5 = Rhizomatous (Rhizoma)

8. FLOWER COLOR (Determine frequency of plants for each color class as defined by USDA Agricultural Handbook No. 424 (Barnes 1972), allowing all plants in plot to flower):

[1 0 0] % Purple and Violet (Subclasses 1.1 to 1.4)

[TRACE] % Variegated Other Than Blue (Subclasses 2.1, 2.2, 2.5 to 2.9)

[ ] % Cream (Class 3)

[ ] % Blue (Subclasses 2.3 and 2.4)

[ ] % Yellow (Subclasses 4.1 to 4.4)

[TRACE] % White (Class 5)

TEST LOCATION: Canyon County, Idaho

9. POD SHAPE (Determine frequency of plants with the following pod shapes produced on well cross-pollinated racemes):

[1 0 0] % Tightly Coiled (One or more coils, center more or less closed)

[ ] % Loosely Coiled (One or more coils, center conspicuously open)

[ ] % Sickle (Less than 1 coil)

TEST LOCATION: Canyon County, Idaho

10. PEST RESISTANCE: Provide in the appropriate column, trial data for application variety, and resistant (R) and susceptible (S) check varieties, synthetic generation tested, average severity index scores (ASI), least significant difference statistics (LSD .05), the institution in charge of test, year, and location of test, and whether test is a field or laboratory evaluation. Describe scoring system, and any test procedure which differs from standard methods proposed by Elgin (1982). Trial data from other test years or locations should be presented whenever available on a separate document as Exhibit D.
Seeds of the check varieties and germplasm lines listed below can be obtained from the USDA Field Crops Laboratory, Bldg. 001, Rm. 335, BARC-West, Beltsville, MD 20705. Although comparisons with check varieties listed below are preferred, comparisons with any appropriate check variety recommended by Elgin (1982) may be presented.

A. DISEASE RESISTANCE: DISEASE	VARIETY	SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	% Resistance ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Anthracnose, Race 1 *(Colletotrichum trifolii)*	Application	1	9.6	131	NA	5.8	Plant Genetics, Inc. 1984
	Arc (R) Saranac AR (R)		59.2	1095			Woodland, California
	Saranac (S)		1.7	1236			Greenhouse
	SCORING SYSTEM: % Seedling survival						
Anthracnose, Race 2 *(Collectotrichum trifolii)* No Data	Application						
	Saranac AR (R)						
	Arc (S)						
	SCORING SYSTEM:						
Bacterial Wilt *(Corynebacterium insidiosum)*	Application	1	61.2	Assumed 150 - 225	1.96	0.39	University of Minnesota 1985
	Vernal (R)		42.0	Assumed 150 - 225	2.28		Rosemount, Minnesota
	Narragansett (S)		5.2	Assumed 150-225	3.69		Field
	SCORING SYSTEM: 0-5; % 0's + 1's = % resistance						
Common Leafspot *(Pseudopeziza medicaginis)* No Data	Application						
	MSA-CW3AN3 (R)						
	Ranger (S)						
	SCORING SYSTEM:						

DISEASE	VARIETY	SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Downy Mildew *(Peronospora trifoliorum)*	Application						
Isolate, if known:	Saranac (R)						
No Data	Kanza (S)						
	SCORING SYSTEM:						
Fusarium Wilt *(Fusarium oxysporum f. medicaginis)*	Application	2	31.3	Assumed 120 - 180	3.07	0.77	Univeristy of Minnesota 1987 Rosemount, MN Field
	Moapa 69 (R)		55.8	Assumed 120 - 180	1.47		
	~~XXXXXXXXXX~~ Mn gn - 1 (s)		0.9	Assumed 120 - 180	4.90		
	SCORING SYSTEM: 0-5; % 0's + 1's = % resistance						
Phytophthora Root Rot *(Phytophthora megasperma f. medicaginis)*	Application	1	34.3	144	2.83	0.28	Plant Genetics, Inc. 1986 Woodland, California Greenhouse
	Agate (R)		35.3	121	2.88		
	Saranac (S)		4.5	275	3.76		
	SCORING SYSTEM: 1-5; % 1's + 2's = % resistance						
Verticillium Wilt *(Verticillium alboatrum)*	Application	1	7.0	213	3.79	0.24	Plant Genetics, Inc. 1984 Nampa, ID Greenhouse
	Vertus (R)		34.1	120	2.82		
	Saranac (S)		0.0	102	4.27		
	SCORING SYSTEM: 1-4; % 1's + 2's = % resistance						
Other *(Specify)*	Application						
	(R)						
	(S)						
	SCORING SYSTEM:						
Other *(Specify)*	Application						
	(R)						
	(S)						
	SCORING SYSTEM:						

B. INSECT RESISTANCE:

INSECT	VARIETY	SYN. GEN. TESTED	PERCENT DEFOLIATION	DEFOLIATION IN PERCENT OF RESISTANT CHECK	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Alfalfa Weevil *(Hypera postica)*	Application						
No Data	Arc (R)			100			
	Saranac (S)						
	SCORING SYSTEM:						

10. B. INSECT RESISTANCE (Continued):

INSECT	VARIETY	SYN. GEN. TESTED	PERCENT SEEDLING SURVIVAL	NUMBER OF SEEDLINGS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Blue Alfalfa Aphid *(Acyrthosiphon kondoi)*	Application	1	17.6	196	NA	4.1	Plant Genetics, Inc. 1984 Woodland, California Greenhouse
	CUF 101 (R)		48.6	193			
	~~XXXXXXX~~ Mesa Sirsa (s)		0.1	2139			
	SCORING SYSTEM: % seedling survival						
Pea Aphid *(Acyrthosiphon pisum)*	Application	2	23.9	163	NA	9.9	Plant Genetics, Inc. 1986 Woodland, California Greenhouse
	~~XXXXXX~~ CUF 101 *		61.8	152			
	~~XXXXXX~~ Moapa 69		7.7	2042			
	SCORING SYSTEM: % seedling survival		As per 6/21/88 letter from J. C. Waseman AB, 7/6/88				
Spotted Alfalfa Aphid *(Therioaphis maculata)*	Application	1	38.6	165	NA	10.1	Plant Genetics, Inc. 1986 Woodland, California Greenhouse
Biotype, if known:	~~XXXXXXX~~ Baker (r)		72.0	184			
	~~XXXXXXX~~ Caliverde (se)		0.5	1868			
	SCORING SYSTEM: % seedling survival						

INSECT	VARIETY	SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Potato Leafhopper Yellowing *(Empoasca fabae)*	Application						
No Data	MSA-CW3An3 (R)						
	Ranger (S)						
	SCORING SYSTEM:						
Other *(Specify)*	Application						
	(R)						
	(S)						
	SCORING SYSTEM:						

C. NEMATODE RESISTANCE:

NEMATODE	VARIETY	SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Northern Root Knot *(Meloidogyne hapla)*	Application						
No Data	Nev. Syn. XX (R)						
	Lahontan (S)						
	SCORING SYSTEM:						

10. C. NEMATODE RESISTANCE (Continued):

NEMATODE	VARIETY	SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Southern Root Knot *(Meloidogyne incognita)*	Application						
No Data	Moapa 69 (R)						
	Lahontan (S)						
	SCORING SYSTEM:						
Stem Nematode *(Ditylenchus dipsaci)*	Application	1	31.5	88	3.44	0.27	Plant Genetics, Inc. 1986
	Lahontan (R)		39.3	95	2.78		Woodland, California
	Ranger (S)		3.0	273	3.86		Greenhouse
	SCORING SYSTEM: 1-5; % 1's + 2's = % resistance						
Other *(Specify)*	Application						
	(R)						
	(S)						
	SCORING SYSTEM:						

11. INDICATE THE VARIETY THAT MOST CLOSELY RESEMBLES THE APPLICATION VARIETY FOR EACH OF THE FOLLOWING CHARACTERS:

CHARACTER	VARIETY	CHARACTER	VARIETY
Winterhardiness	Saranac AR	Plant Color	No critical data
Recovery After 1st Cut	Saranac AR	Crown Type	No critical data
Area of Adaptation	Saranac AR	Combined Disease Resistance	Blazer, Apollo
Flowering Date	No critical data	Combined Insect Resistance	Decathlon

REFERENCES

Barnes, D.K. 1972. A System for Visually Classifying Alfalfa Flower Color. U.S. Dep. Agric. Handb. 424. 18 pp. (Note: Greenish cast of plate 6, A and B is an artifact of printing, actual colors a blend of yellow and white.)

Elgin, J.H., Jr., (ed.). 1982. Standard Tests to Characterize Pest Resistance in Alfalfa Cultivars. U.S. Dep. Agric. Tech. Bull. (In Press).

Gunn, C.R., W.H. Skrdla, and H.C. Spencer. 1978. Classification of Medicago sativa L. using legume characters and flower colors. U.S. Dep. Agric. Tech. Bull. 1574. 84 pp.

Munsell Color Co. 1977. Munsell Plant Tissue Color Charts. Munsell Color Co., Inc. Baltimore.

NOTE: Any additional descriptive information and supporting documentation may be provided as Exhibit D.

Exhibit 14E

The principal breeder, Ike Kawaguchi, was employed by PLANT GENETICS, INC. All rights to alfalfa varieties developed by the breeder while employed by PLANT GENETICS, INC. are assigned to PLANT GENETICS, INC.